March 1992 A Cahners Publication

R&D
Research & Development®

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Diamond Films Advance
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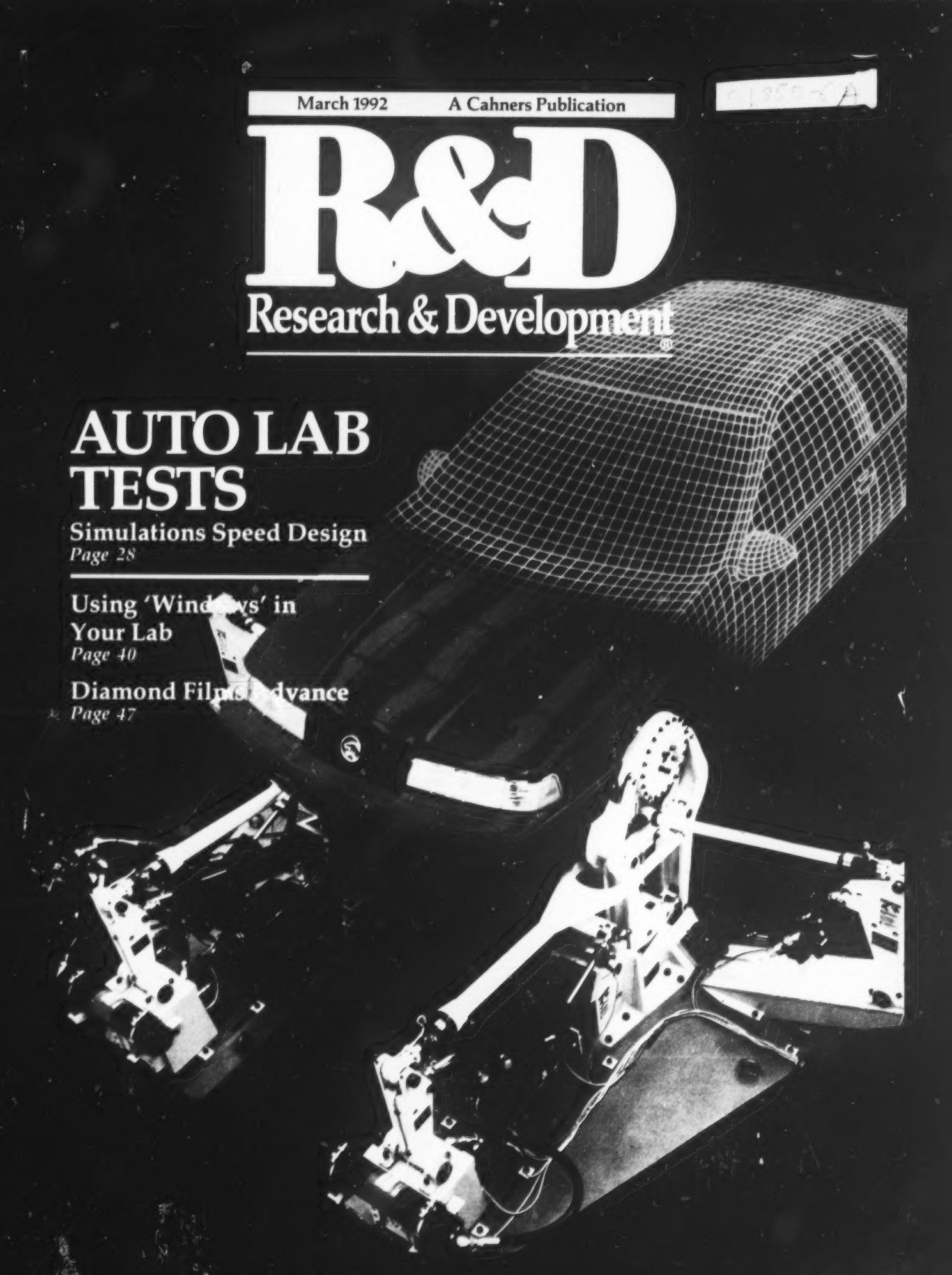
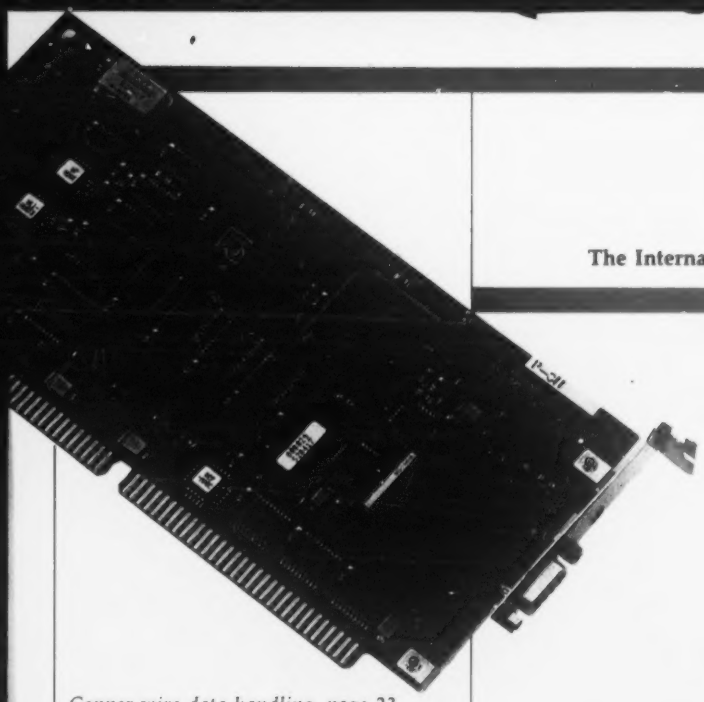


R&D

The International Magazine of Research and Development



Copper wire data handling, page 23

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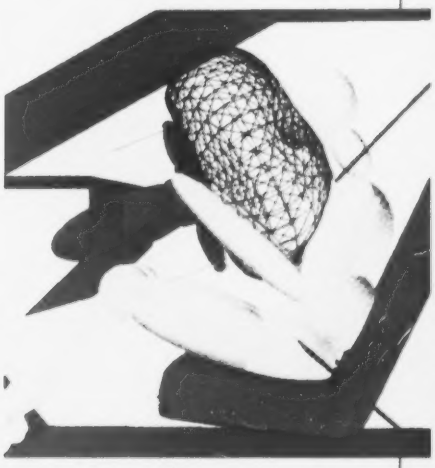
ABOUT THE COVER Spindle-mounted laboratory road simulators are being combined with computer models to accelerate the development of new automotive designs. *Original lab picture courtesy of Ford Motor Co.*

FEATURES



Automotive research, page 28

Auto Lab Simulators Speed New Model Development 28

Road and crash simulators help automotive researchers shorten structural test cycles and obtain more reliable information.

Tour the Wonderful World Of Microsoft Windows 40

These new software applications may help you greatly expand your laboratory PC's multitasking capabilities.

Diamonds Are a Chip's Best Friend 47

Because of diamond's uniqueness, research into diamond films may spark the next microelectronics revolution.

R&D BUSINESS

Foreign Investment in U.S. Companies Slows Except in High Tech Areas

Since peaking in 1989, foreign direct investment in U.S. companies has dropped steadily over the past two years, according to recent studies. Total foreign direct investment by all countries was nearly $60 billion in 1989, according to researchers at the Institute for International Economics, Washington, DC. This was halved in 1990 to $30 billion and halved again in 1991 to $15 billion.

After steadily increasing their investments over the past decade, even Japanese investors have cut back their spending from a record $14 billion in 1989 to $11.9 billion in 1990, and only $3.8 billion in 1991, according to a study by the Japan M&A Reporter published by Ulmer Brothers, a New York investment bank.

Foreign investments in high-technology U.S. firms were the exception to these trends, increasing more than 30% in 1991, according to a study by the Economic Strategy Institute (ESI), Washington, DC. Japan was the largest investor in this area, accounting for more than 67% of the 536 high-technology investments reported by ESI from October 1988 to October 1991.

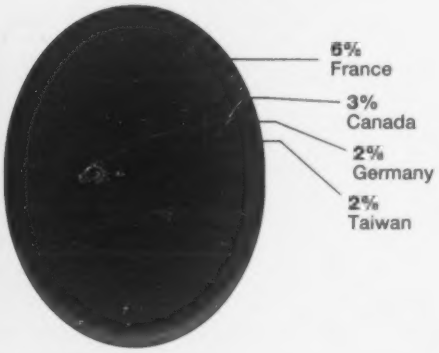
The largest investment increases in the high-technology area were in chemicals (a 68% increase from May to October 1991 with 21 new investments), electronics (a 41% increase with 14 new investments), telecommunications (up 34% with 15 new investments), and computers (up 27% with 28 new investments). The computer area garnered the largest number of investments with 133 of the 536 total.

More than 41% of Japan's total foreign direct investment was in U.S. companies in 1990, according to Japan's Ministry of Finance. Japan's slowdown in overall U.S. corporate investments is attributed by analysts to several causes: the decline in the Tokyo stock market and the resultant lower availability of capital, a shift to more European investments, a preference to build new plants in the U.S. rather than invest in existing plants, disappointment with the results of earlier investments, and a desire to keep a "low-profile" to avoid political backlash.

—Tim Studt

Who's Buying U.S. High Tech Companies?

Share of 536 acquisitions from October 1988 to October 1991



Source: Economic Strategy Institute

***Japanese companies continue** to invest in U.S. high-tech firms, such as those in composite materials, pharmaceuticals, electronics, and telecommunications.*

Computer Production Dips to 15-Year Low

U.S. production of computer and office equipment increased a scant 3.4% in 1991, the smallest annual increase since the 10% decline registered in 1975, according to Cahners Economics (CE), Newton, MA.

Computer production surged in the final months of 1991; however, the gains were small compared to previous years' increases.

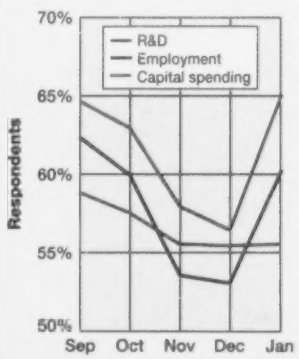
Even Japan's computer industry is sliding into its first recession, according to a forecast by the Nihon Keizai Shimbun, publisher of *The Nikkei Weekly*. The combined pretax profits of Japan's five major computer makers—Hitachi, Toshiba, Mitsubishi Electric, NEC, and Fujitsu—is forecast to drop 22% for the fiscal year ending in March 1992.

The downsizing of computer systems, from mainframes to desktop PCs and workstations, is one reason for the current decline. "Computers

Ease of Use Drives UV/Vis Growth

The market for ultraviolet/visible spectrophotometers is forecast to grow 8.5% annually over the next five years, according to Strategic Directions Intl., a Los Angeles-based consulting firm.

Scanning instruments make up the largest segment of this market. Ease of use and broad applicability make UV/Vis instruments a necessary part of most laboratories for a quantitative analysis.



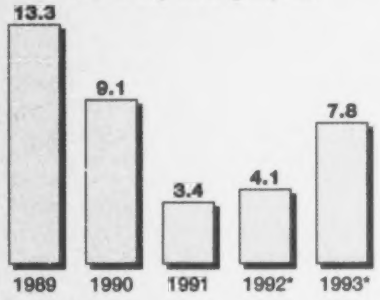
R&D Confidence Up

The new year brought in a brighter outlook in corporate executives' ability to maintain their business efforts, according to a survey by Cahners Economics (CE), Newton, MA.

More than 64% of the 400 companies interviewed in CE's January survey said their R&D would remain stable or increase over the next few months.

are being compared to household appliances, and industry profits will deteriorate further," says Noboru Makino, chairman of the Mitsubishi Research Institute, Tokyo. □

Computer Production Growth Hits 15-Year Low
(Percent growth per year)



*estimated
Source: U.S. Federal Reserve Board

After experiencing its lowest growth rate in 15 years in 1991, computer production is forecast by Cahners Economics to slowly increase over the next two years.

High-Tech Firms Hire Most Engineers

U.S. manufacturing industries employed more than 1.7 million scientists, engineers, and technicians (SET) in 1989, according to the National Science Foundation, Washington, DC.

Nearly 82% of these personnel were employed in only six high-technology industries—instruments, chemicals, transportation, electrical machinery, nonelectrical machinery, and refined petroleum products.

The SET figures consisted of 192,000 scientists, 804,000 engineers, 586,000 technicians, and 144,000 managers. SET personnel in manufacturing R&D areas comprised 191,000 of the total. For more information, call 202/634-4284. □

NIH Sponsors Tech Transfer Program

Have a problem with squirrels eating the birdseed before the birds can get to it? Solutions to this and other problems are available through a U.S. Public Health Service (PHS) technology transfer program administered by the National Institutes of Health, Bethesda, MD, for all PHS agencies.

Information concerning these programs is contained in the *1991 Technology Transfer Directory*. For information, call 301/496-0750.

By the way, NIH researchers solved the birdseed problem by coating birdseed with capsaicin-like compounds. Capsaicin, the pungent ingredient in chili peppers, repels mammals, but is readily consumed by birds who lack hot-taste receptors. □

Plan Now For Next Economic Upturn

Harry W. Matthews Jr., a consultant with Arthur D. Little Inc., Cambridge, MA, encourages companies to establish several programs to improve their capabilities for the next upturn. He says that during the current recession companies should:

- Prune dead products
- Close unproductive plants
- Cut unnecessary fixed costs
- Activate allies
- Advertise in niche markets
- Develop high-performance teams
- Create new labor arrangements
- Streamline the work process
- Continue R&D
- Improve response time.

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R&D SOFTWARE

Support Problem Solver

Mahogany HelpDesk version 2.0 is designed to improve the quality and speed of problem resolution in customer support, technical support, and helpdesk environments.
Emerald Intelligence Circle 347

Mass Spec Library Search

Version 2.2 is an enhancement of BenchTop/PBM, a PC software product for mass spec library search. The system uses the easy-to-use Microsoft Windows environment to combine PBM library search algorithms with the Wiley Registry of Mass Spectral Data, 5th Edition. Version 2.2 includes expanded background subtraction capabilities, a new mass chromatogram display, and new features for editing and averaging scans.
Palisade Corp. Circle 344

Intelligent X-Ray Analysis

IMIX XD provides the analyst complete control over spectral display, including presentation of multiple spectra for comparison on split-screen display to highlight detail. Several separate display windows can be used, each having up to 16 spectra. XD also features Energy Windows, providing quick access to elemental x-ray line data for peak integration, digital "dot maps," and elemental line profiles.
Princeton Gamma-Tech Circle 345

Driver for High-Speed Data Acquisition Boards

The driver program offers several new trigger commands, improved memory support, and more efficient memory usage. The combination of this new driver and the company's Flash-12 and WorkMate boards performs many functions that have come into demand for high-speed data acquisition, up to 1 MHz.
Strawberry Tree Inc. Circle 273

Calculate 2-D IR Correlation Spectra

The company created 2DIR to run under Lab Calc, its powerful post-processing software. The program simplifies the analysis of time-resolved spectroscopic responses of a sample to sinusoidal perturbations.
Galactic Industries Corp. Circle 346

CIRCULATION

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